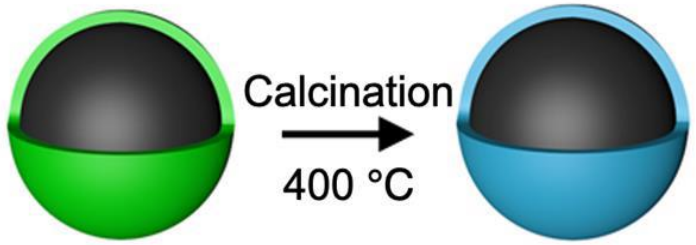
Tohoku Univ. Technology

Realization of 4.7 V class lithium-ion battery

Avoid side reaction and prevent battery performance degradation

Thin nano film coating of fluoride solid electrolyte



Fluoride@LNMO

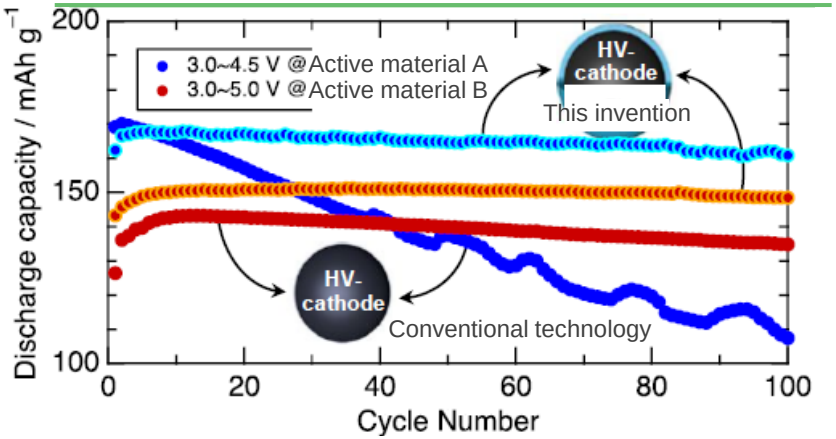
Overview

Lithium-ion battery (LIB) makes part of our live through a wide range of applications such as smartphone, mobile battery, laptop PC, car, etc. In this context, there are constant requests for performance improvement, such as operation at higher voltage. It is known that operation at high voltage results in a decrease in battery capacity and in cycle retention rate due to side reaction between the electrolyte and the positive-electrode active material.

This invention overcomes the conventional issues by coating the positive-electrode active material with a layer. This coating layer reduces side reactions, which results in more stable operation at high voltage than conventional technology.

This invention can improve for example the charge/discharge cycle characteristic of high-potential spinel oxide positive electrode, which is a LIB positive electrode material that does not use cobalt metal having a supply chain risk. Therefore, it can create high energy density storage battery which is low cost & risk-free metal resources.

Charge/discharge cycle characteristic



Able to obtain charge/discharge cycle characteristic without degradation for more than 100 cycles by coating the surface of the cobalt-free spinel oxide active material for 4.7 V class cathode with a fluoride solid electrolyte layer.

Product Application

- ☐ Lithium-ion battery
- ☐ Solid state battery
- ☐ Magnesium battery
- ☐ Cobalt-free rechargeable battery

Related Works

[1] Effective Li_3AlF_6 Surface Coating for High Voltage Lithium-Ion Battery Operation, Hiroaki Kobayashi, Guohao Yuan, Yoshiyuki Gambe and Itaru Honma, submitted, 2021

IP Data

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